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(56) Documents cited

**GB A 2167802**

**EP A1 0119133**

**US 4624491**

(58) Field of search

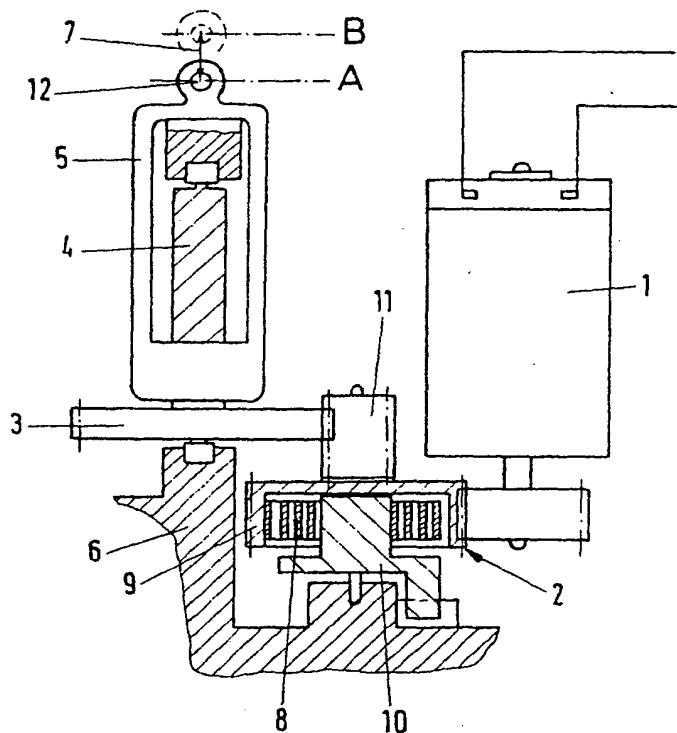
**E2A**

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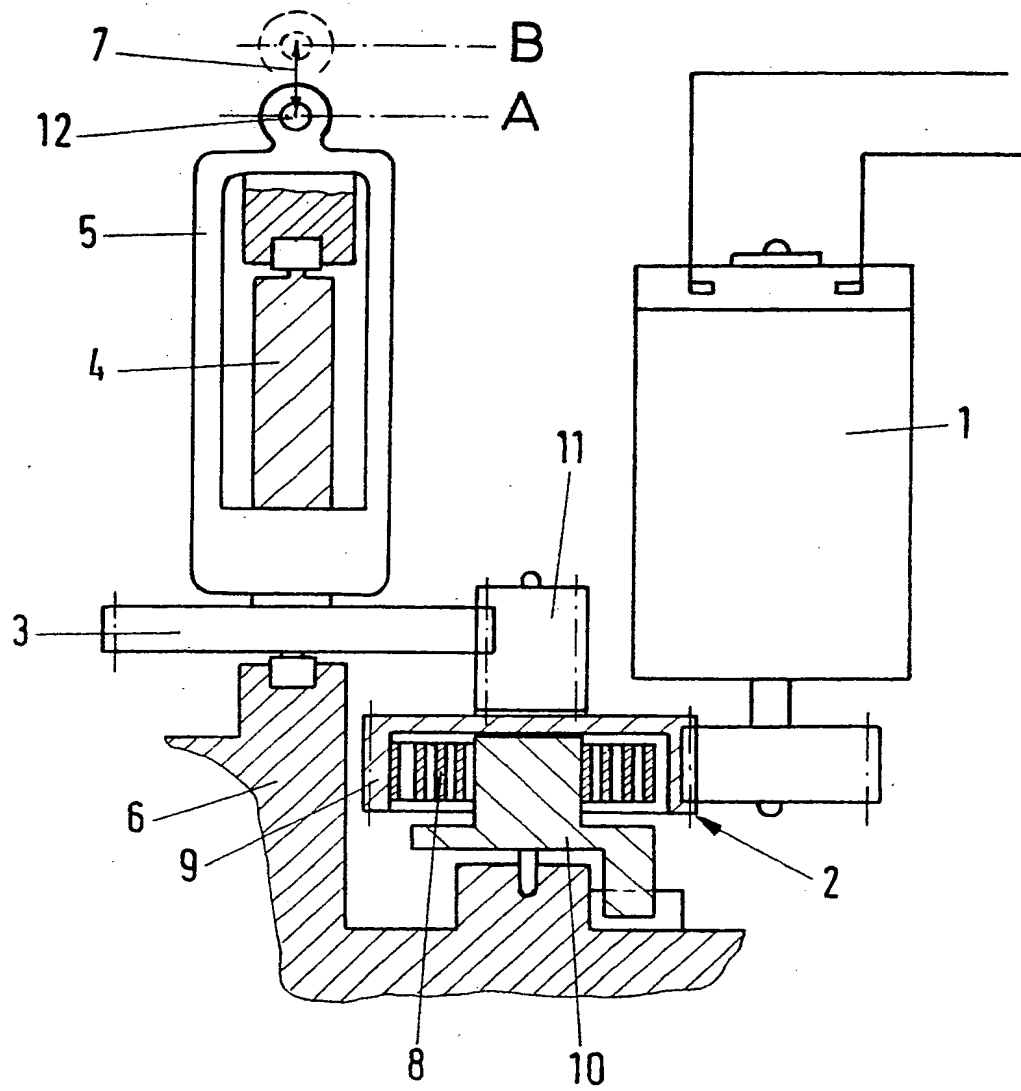
## (54) **Motor vehicle door lock setting drive**

(57) The drive, particularly for central locking device, has an electric motor 1, transmission 2, gear and leadscrew unit 3, 4, and a setting member 5, all in a housing 6, and the transmission has built therein a coil spring 8 one end of which is secured in a cup-shaped gear wheel 9 while the other end is secured to the housing 6 through an initial tension adjusting member 10, as the motor operates to advance or retract the setting member 5 the spring 8 is tensioned, so that when the motor 1 is switched off the energy stored in the spring 8 and the torque it sets up rotates the transmission, motor armature and other moving parts in the opposite sense to effect retraction or advancement of the setting member 5.

Spring 8 may be clock spring or helical coil.



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## SPECIFICATION

### Vehicle door lock setting drive

5 The invention relates generically to a setting drive for a motor vehicle door lock, more particularly - but not exclusively - to central locking devices for motor vehicles, having an electric motor, a transmission, a gear and leadscrew unit, and a setting member, in which the specified components are disposed in a housing and the setting member can be advanced by interaction with the leadscrew. The setting member is attached, for example, to the operating lever of a motor vehicle door lock and sets the lever in a locking position and/or a theft-proof position.

In the known setting drive, the setting member can be retracted with the aid of the electric motor by reversing the electric motor polarity. This is a nuisance, depending on the nature of the motor vehicle door lock. It is a nuisance, for example, when it is required to open by hand, from inside the vehicle, a motor vehicle door lock which has been locked by means of the central locking device. Manual force must be applied through the means provided to retract the setting member and at the same time operate the transmission and electric motor as inert resistances. The situation is similar in other applications of this type of setting drive, even if kinematic reversal is provided in respect of the retraction and advancing operations.

35 The object of the invention is to modify and improve a setting drive of the type initially described, so that the setting member can be retracted into its released position without actuating the electric motor and without applying manual force.

According to the present invention, a spring that can be tensioned by a rotary motion is built into the transmission, one end being secured to a rotating component of the transmission while the other end is secured directly or indirectly to the housing, the spring being tensioned by the electric motor as the setting member is being advanced so that the setting member can be moved back again by the spring after switching the electric motor off. Various constructional means can be adopted for this purpose. A preferred embodiment of the invention, in which the spring can be very neatly built into the transmission, is characterised in that the transmission contains a cup-shaped gear wheel, which accommodates the spring and is secured to the moving end of the spring. The spring can be designed like a clock spring for example. Alternatively, a helical coil spring can be used. The end of the spring not secured to the transmission is preferably secured to the housing by an initial tension adjusting member.

An embodiment of the setting drive in accordance with the invention, will now be described, purely by way of example, with reference to the accompanying diagrammatic drawing.

The setting drive shown in the drawing is intended for a motor vehicle door lock, which may form part of a central locking device. The basic components of the setting drive are an electric motor 1, a transmission 2, a gear and leadscrew unit 3, 4, and a setting member 5.

70 These components are disposed in a housing 6 only part of which is shown in the drawing. The setting member 5 can be advanced and retracted, in the directions shown by the double-ended arrow 7, by interaction with the leadscrew 4.

A spring 8 is built into the transmission 2. One end of the spring 8 is secured to a rotating component 9 of the transmission, while the other end is secured directly or indirectly to the housing 6. The arrangement is such that the spring 8 can be tensioned by the electric motor 1 as the setting member 5 is being advanced. Conversely, the arrangement is such that the setting member 5 can be moved back again by the spring 8 after switching the electric motor off. In the embodiment shown, the transmission 2 contains a cup-shaped gear wheel 9 as one of its components. The spring 8 is mounted inside it and is designed like a clock spring. The end of the spring 8 not secured to the transmission is secured to the housing 6 an initial tension adjusting member 10. When the electric motor 1 is switched on, a rotary motion is imparted to a transmission pinion 11 keyed to the gear wheel 9 and thence to the gear and leadscrew unit 3, 4, and converted by the leadscrew 4 and the setting member 5 to a translatory motion of a connecting lug 12 on the setting member from A to B against a resistance force.

During this process the coil spring 8 is tensioned (i.e., wound up) between the gear wheel 9 and the adjusting member 10 engaging the housing 6, so that a proportion of the electrical energy supplied by the electric motor 1 is stored as mechanical energy.

When the electric motor is switched off after the process just described has taken place, the energy stored in the clock spring 8 and the torque it sets up rotates the transmission, the motor armature and the other moving parts in the opposite sense to their initial rotation, thereby reversing the initial translatory motion of the connecting lug 12. Apart from the fact that no external force need be applied in the direction of motion, the components can even be designed to move the connecting lug 12 against a resistance force opposing its motion.

## CLAIMS

1. A setting drive for a motor vehicle door lock, having an electric motor, a transmission, a gear and leadscrew unit, and a setting member

ber in which the specified components are disposed in a housing and the setting member can be retracted and advanced by interaction with the leadscrew, wherein a spring that can be tensioned by rotary motion is built into the transmission, one end being secured to a rotating component of the transmission while the other end is secured directly or indirectly to the housing, the spring being tensioned by the electric motor as the setting member is being retracted or advanced, and the setting member can be moved back again by the spring after switching the electric motor off.

2. A setting drive as in Claim 1, wherein the transmission contains a cup-shaped gear wheel, which accommodates the spring and is secured to the moving end of the spring.

3. A setting drive as in either of Claims 1 and 2, wherein the spring is designed like a clock spring.

4. A setting drive as in either of Claims 1 and 2, wherein the spring is a helical coil spring.

5. A setting drive as in any one of Claims 1 to 4, wherein the end of the spring not secured to the transmission is secured to the housing through an initial tension adjusting member.

6. A setting drive for a motor vehicle door lock substantially as hereinbefore described with reference to the accompanying drawing.

#### CLAIMS

Amendments to the claims have been filed, and have the following effect:-

Claims 1-6 above have been deleted or textually amended.

New or textually amended claims have been filed as follows:-

#### CLAIMS

1. A setting drive for a motor vehicle door lock, having an electric motor, a transmission, a gear and leadscrew unit, and a setting member in which the specified components are disposed in a housing and the setting member can be retracted and advanced by interaction with the leadscrew, wherein a spring that can be tensioned by rotary motion is accommodated in a cup-shaped gear wheel of the transmission, one end of the spring being secured to the cup-shaped gear wheel, while the other end of the spring is secured directly or indirectly to the housing, the spring being tensioned by the electric motor as the setting member is being retracted or advanced, and the setting member can be moved back again by the spring after switching the electric motor off.

4. A setting drive as in any one of Claims 1 to 3, wherein the end of the spring not secured to the cup-shaped gear wheel is secured to the housing through an initial tension adjusting member.

Claims 3, 4, 6 above have been re-num-

bered as 2, 3, 5 and their appendancies corrected.

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**Claims searched:** 1-17

**Examiner:** Barnaby Wright  
**Date of search:** 24 October 2002

## **Patents Act 1977**

### **Search Report under Section 17**

#### **Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): E2A (AMB, AMXD, AMXE, AMXF, AMXG, AMXH, AMXT, AMXW, AMXX, AMXY)

Int Cl (Ed.7): E05B (15/04, 47/00, 65/12); H02K (7/00, 7/06, 23/68)

Other: Online: EPODOC, JAPIO, WPI

#### **Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2193748 A (KIEKERT)	-
A	EP 1128006 A2 (MERITOR)	-
A	EP 0939245 A1 (EATON)	-
A	US 4203573 (BOSS)	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

